

## MOPP and MOOP in IEC 60601-1 3<sup>rd</sup>

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The new IEC60601-1 3rd edition standard is the harmonized standard for medical electrical equipment that has been adopted globally, and published as the following versions:

USA: ANSI/AAMI ES 60601-1:2005  
 EU: EN60601-1:2005  
 Canada: CSA-C22.2 No. 60601-1:08

The major impact of 3<sup>rd</sup> edition is the distinction made between operator and patient. As result, **Means of Protection (MOP)** was introduced and it is further categorized into 2 different classifications, which are **Means of Patient Protection (MOPP)** and **Means of Operator Protection (MOOP)**.

It is the responsibility of the medical product manufacturer to determine the likelihood of a patient coming into contact, and decide whether patient protection (MOPP) or operator protection (MOOP) to use.

In either case, the insulation between PRIMARY to SECONDARY must meet at least 2 x MOP under and at least 1 x MOP between PRIMARY to protective earth (FG) at normal conditions. It is shown on Figure 1.

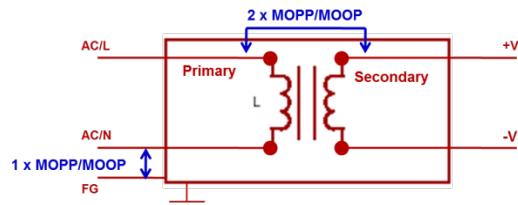


Figure 1.

The isolation, creepage and insulation requirement for MOPP and MOOP are different and provided in Table 1.

TABLE 1.

CLASSIFICATIONS	ISOLATION	CREEPAGE / CLEARANCE	INSULATION
1 x MOOP	1500 Vac	2.5 mm / 2mm	Basic
2 x MOOP	3000 Vac	5 mm / 4mm	Double
1 x MOPP	1500 Vac	4 mm / 2.5mm	Basic
2 x MOPP	4000 Vac	8 mm / 5mm	Double

*Creepage* is the shortest path between two conductive parts measured along the surface of the insulation.

*Clearance* is the shortest distance through air between two conductive parts.

Generally speaking, MOOP follows the requirement guideline from IEC60950 and MOPP follows 60601-1 2nd edition.

IEC 60601-1 2<sup>nd</sup> edition did not categorize devices for patients or operators contacts, but this new concept was introduced in 3<sup>rd</sup> edition.

For equipment used within laboratory environment without contacting patients, a power supplies that meet 2 x MOOP standards is normally sufficient.

A power supplies that meet 2 x MOPP standards provide the highest level of protection. It can be advantageous to specify a 2 x MOPP power supply because it can cover most of medical applications.

MEAN WELL has a board range of MOPP and MOOP power supplies with output power from 5~600Watt with different style, e.g. metal-enclosed, open-frame, on-board or external adaptor.

Please contact MEAN WELL authorized distributors or sale representatives for more information.